

 NEUROLOGY AND COVID-19 IN 2020

Neurological telemedicine in the COVID-19 era

Victor Patterson 

Many neurologists have used telemedicine during the COVID-19 pandemic. Studies have shown that videolinks in acute care can save personal protective equipment and protect staff. Furthermore, the telephone can provide supra-hospital care in Parkinson disease and manage patients with amyotrophic lateral sclerosis well. The primacy of face-to-face care has been dented.

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11-week period this approach saved PPE costs from the 3,508 virtual visits made. This study is an example of the second reason to use telemedicine — where it has a clear advantage over traditional face-to-face medicine.

Northern Italy bore the early brunt of COVID-19 in Europe, and in Milan patients with Parkinson disease were prevented from travelling to hospital. Cilia and colleagues describe their approach to this problem using two different types of real-time telemedicine⁶. First, a Parkinson disease nurse specialist (PDNS) contacted the patient by telephone, filled in a questionnaire and was able to deal with any problems in two-thirds of cases. Of the remaining patients, one-third were referred to a neurologist, with the rest going to other members of the multidisciplinary team. The neurologist then used a videolink to contact the patients at their home so that only about 1 in 45 patients who were originally contacted by the PDNS ended up with a face-to-face consultation. The remarkable thing about this study is that the PDNS service, ParkinsonCare, is a national, free-to-access service that is not associated with any individual hospital⁷, thus demonstrating the potential of telemedicine to deliver services easily across hospitals and even nationally.

Another paper concerns the management of patients with amyotrophic lateral sclerosis (ALS). When their patients with ALS were quarantined in Southern Italy, Capozzo and

Two reasons exist to use telemedicine¹: first, if no other way of practising is possible; and second, if using telemedicine has clear advantages over traditional face-to-face medicine. The former reason has been thrust into the limelight by the COVID-19 pandemic as restrictions of various sorts have made outpatient face-to-face consultations impossible, and many neurologists, all over the world, have started using various types of telemedicine to manage their patients (BOX 1).

Most papers on telemedicine in neurology (teleneurology) were published in the 20 years before the pandemic and generally showed — from coma to headache — that it could replicate everything done by face-to-face consultation, was generally liked by patients, often produced cost-savings and had a low carbon footprint. Despite these findings, before the pandemic, relatively few neurologists anywhere used telemedicine in their everyday practice.

Two main reasons probably accounted for this lack of uptake: first, there was no incentive to change practice; and second, a fear prevailed that practising telemedicine might not quite be legal. Usually the laws of individual countries governing medical practice have made no mention of whether telemedicine is legal or not. In 2017, Bahrani et al. at the All-India Institute of Medical Sciences (AIIMS) in Delhi published the results of a randomized controlled trial (RCT) showing that for outpatients with epilepsy, telephone review was superior to face-to-face review in terms of patients' costs and number of patients

retained in follow-up². RCTs are rare in teleneurology, yet these positive results were never put into practice, which was almost certainly because of concerns about the legality of telephone telemedicine.

Thus, the first key advance I want to highlight from 2020 comes not from the pages of an eminent medical journal but from the website of the Government of India³. The website sets out guidelines, published in March 2020, by which telemedicine may be practised in India. Crucially, it makes the explicit statement that “A Registered Medical Practitioner is entitled to provide telemedicine consultation to patients from any part of India”. This statement effectively legitimizes the practice of telemedicine in India and has had a hugely positive effect on how it is now being used there. Other countries have similarly redefined their guidance on telemedicine to make its practice easier.

Many more papers have been published this year on teleneurology than in any previous year, but it is unreasonable to expect substantial studies in the short time since the pandemic was first declared. Three short clinical pieces feature important points that deserve to be more widely known.

The first study comes from the Mayo Clinic in the USA, which has a well-established telemedicine programme and saw its clinician-user numbers increase by 2,000% during the pandemic⁴. This paper from their Emergency Department⁵ describes how videolinks within their department can provide patient care for neurological and other presentations while reducing not only the exposure of health-care workers to potential coronavirus situations but also the requirement for personal protective equipment (PPE). Access to videolinks within patients' rooms enabled the vast majority of ‘checking’ visits to be carried out remotely, and they estimated that over an

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Key advances

- The Government of India has stated explicitly that the practice of telemedicine is legal³.
- Teleconferencing in acute hospital settings protects health-care staff and reduces usage of personal protective equipment⁵.
- For the management of Parkinson disease, a supra-hospital, nurse-provided telephone service with access to a multidisciplinary team, combined with video consultations with a neurologist if required, can manage >90% of patients without face-to-face attendance⁶.
- Telephone telemedicine is effective and preferred to conventional care by the majority of patients with amyotrophic lateral sclerosis⁸.
- Specific skills can enhance the use of videolinks, and neurologists should be aware of these skills⁹.

colleagues set out to provide them with a multidisciplinary telemedicine service⁸. They initially planned to use video consultation but all 31 patients refused, mostly because they did not own a computer or smartphone. This issue is important as considerable numbers of people across the world cannot participate in video calls because they do not have either the requisite equipment or the technological knowhow. Instead, Capozzo et al. used the telephone and found that they could manage the patients remarkably well and that 90% of patients would prefer to be managed this way in future. Not only does this study show the strength of telephone communication, but it also makes one wonder whether face-to-face appointments for patients with severe neurological disabilities

exist for the benefit of the patient or the benefit of the neurologist.

Finally, a how-to-do-it paper from someone who has been doing videolink teleneurology for many years in Scotland is notable⁹. There is a technique to teleneurology just like everything else in neurology, and studying it brings benefits. The authors set out how to get the best of both high-end equipment in a hospital setting and commercially available software for home use. They recorded a 3,000% increase in home video calls in all specialties in Scotland in the first weeks of the pandemic and emphasize that the real-time technical support so essential for high-end video conferencing can be delivered nationally rather than by individual hospitals.

In this Year in Review there is one striking omission: hardly any papers on asynchronous teleneurology using email, webservers or smartphone applications were published in 2020. These technologies have a big advantage over real-time methods (such as the phone and video conferencing) as they usually take less of a neurologist's time. Perhaps their potential will be realized in coming years as well as further applications of synchronous teleneurology now that many more neurologists all over the world are using these approaches.

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1. Craig, J. & Patterson, V. Introduction to the practice of telemedicine. *J. Telemed. Telecare*. **11**, 3–9 (2005).
2. Bahrani, K. et al. Telephonic review for outpatients with epilepsy—a prospective randomized, parallel group study. *Seizure* **53**, 55–61 (2017).
3. Board of Governors of Medical Council of India. *Telemedicine practice guidelines*. <https://www.mohfw.gov.in/pdf/Telemedicine.pdf> (2020).
4. Demaerschalk, B. M., Blegen, R. N. & Ommen, S. R. Scalability of telemedicine services in a large integrated multispecialty health care system during COVID-19. *Telemed. J. E. Health* <https://doi.org/10.1089/tmj.2020.0290> (2020).
5. Russi, C. S., Heaton, H. A. & Demaerschalk, B. M. Emergency medicine telehealth for COVID-19: minimize front-line provider exposure and conserve personal protective equipment. *Mayo Clin. Proc.* **95**, 2065–2068 (2020).
6. Cilia, R., Mancini, F., Bloem, B. R. & Eleopra, R. Telemedicine for parkinsonism: a two-step model based on the COVID-19 experience in Milan, Italy. *Parkinsonism Relat. Disord.* **75**, 130–132 (2020).
7. Willcocks, V. Parkinson Italia calls for permanent Italian tele-medicine service for people with Parkinson's. *European Parkinson's Disease Association* <https://www.epda.eu.com/latest/news/parkinson-italia-calls-for-permanent-italian-tele-medicine-service-for-people-with-parkinsons/> (2020).
8. Capozzo, R. et al. Telemedicine is a useful tool to deliver care to patients with Amyotrophic Lateral Sclerosis during COVID-19 pandemic: results from Southern Italy. *Amyotroph. Lateral Scler. Frontotemporal Degener.* **12**, 1–7 (2020).
9. Duncan, C. & Macleod, A. D. Video consultations in ordinary and extraordinary times. *Pract. Neurol.* **20**, 396–403 (2020).

Competing interests

The author declares no competing interests.

Box 1 | Types of telemedicine

Real-time (synchronous)

- Telephone
- Video call
- Video conferencing with far-end camera control and an assistant with the patient to perform an examination

Store-and-forward (asynchronous)

- Email
- Webservice
- Smartphone applications